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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/786,133

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Fumiyoshi Kirino

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EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/786,133

Applicant(s)

KIRINO ET AL.

Examiner

Rodney G. McDonald

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 55-60 and 62-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 55-60 and 62-67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 67 is objected to because of the following informalities:

The status identifier is wrong in claim 67. It should indicate that it is a new claim.

Also Applicant only refers to claims 55-60 and 62-66 as pending. Is claim 67 meant to be even present?

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 55-57 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. (U.S. Pat. 5,232,569) in view of Chen et al. (Japan 10-302242).

Regarding claims 55, Nelson et al. teach a method and apparatus for producing a film utilizing microwaves at the electron cyclotron resonance to create a region of plasma which is devoid of magnetic field and at least one high-radio frequency planar disk diode positioned within the region devoid of magnetic field, a target attached to the rf planar diode and a high radio frequency substrate biasing electrode parallel to the planar diode. (See Abstract) The apparatus can be used to deposit coatings for magnetic recording applications. The materials for the thin layers to be deposited on metal substrates can include a hard, refractory, chemically inert first coating, a second coating consisting of chromium, a suitable chromium-vanadium alloy, or any other appropriate chromium alloy, a third coating consisting of an appropriate cobalt-chromium alloy, cobalt-chromium-tantalum alloy, or any other suitable cobalt alloy; a fourth coating consisting of titanium as an interfacial adhesion layer; and a fifth coating consisting of amorphous carbon with high diamond-like content but with some graphite content. (Column 8 lines 61-68; Column 9 lines 1-13) The antennae array 14 of the apparatus operates in the electron cyclotron resonance mode to produce a plasma. (Column 5 lines 57-61; Column 10 lines 47-49) The plasma sputters the target. (Column 7 lines 63-68) A bias voltage is applied to the substrate platen to control the film morphology of the depositing film. (Column 8 lines 24-29) The layer to be deposited can be at least a magnetic layer from magnetic targets. (Column 8 lines 18-23) Nelson et al. envisages utilizing the apparatus to deposit the other layers in a magnetic medium including a first hard, refractory, chemically inert coating, a chromium layer a Cr-V alloy or other appropriate chromium alloy layer, a titanium interfacial

Art Unit: 1753

adhesion layer and a protective layer having amorphous carbon in it. (Column 8 lines 61-68; Column 9 lines 1-13)

Regarding claims 56, microwave is used to generate the resonance. (See Abstract)

Regarding claims 57, a radio frequency power source is utilized to apply a bias to the substrate. (Column 8 lines 23-29)

The difference between Nelson et al. and the present claims is that the granular structure of the film is not discussed (Claim 55) and the granular structure in which an amorphous material formed of oxide surrounds a crystalline phase formed of cobalt or cobalt alloy. (Claim 55, 67)

Regarding the granular structure of the film, since Nelson utilize the same process as Applicant's to deposit the film it is presumed that the magnetic film will have a granular structure. Nelson also suggest controlling the morphology of the film. (See Nelson discussed above) Furthermore, Chen recognize that a magnetic film can be formed by sputtering where the magnetic grains are segregated by a segregant. (See Abstract) The segregant can be an oxide which surrounds the Cobalt at the grain boundaries. (See Translation Page 55)

The motivation for utilizing a granular film surrounded at the grain boundaries by an oxide is that it allows production of a magnetic film that has high saturation coercive force. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Nelson by utilizing a granular film

structure with oxide at the grain boundaries as taught by Chen et al. because it allows for production of a magnetic film that has high saturation coercive force.

Claims 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of Chen et al. as applied to claims 55-57 and 67 above, and further in view of Howard (U.S. Pat. 4,778,582).

The difference not yet discussed is where the protective layer is formed from a target of carbon and where sputtering gas contains argon and contains at least one of nitrogen and hydrogen.

Howard teach sputtering a protective layer on a magnetic disk by utilizing a graphite target (i.e. carbon target) and utilizing an Ar and H₂ atmosphere. (Column 3 line 23, lines 35-40)

The motivation for forming a protective layer from a target of carbon and where sputtering gas contains argon and hydrogen is that it allows for producing a layer that has good corrosion resistance and wear resistance. (Column 1 line 68; Column 2 lines 1-2)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the protective layer from a graphite target and in a sputtering atmosphere of Ar and H₂ as taught by Howard because it allows for producing a layer that has good corrosion resistance and wear resistance.

Claims 60, 63, 65 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of Chen et al. as applied to claims 55-57 and 67 above, and further in view of Shiroishi et al. (U.S. Pat. 4,833,020).

Art Unit: 1753

Nelson in view of Chen et al. is discussed above and all applies as above. (See Nelson in view of Chen et al. discussed above)

The difference not yet discussed is where the underlayer consists of at least one selected from the group consisting of cobalt oxide, chromium oxide, iron oxide, nickel oxide and magnesium oxide and at least one selected from the group consisting of silicon oxide, aluminum oxide, titanium oxide, tantalum oxide and zinc oxide from a target.

Nelson et al. discussed above teach depositing an underlayer by sputtering from a target. (See Nelson et al. discussed above) Shiroishi et al. teach forming an underlying layer from at least one of aluminum oxide, silicon oxide and magnesium oxide. (Column 16 lines 23-27) The layers can be formed by sputtering. (Column 6 lines 26-29)

The motivation for utilizing an underlayer having at least one of magnesium oxide, aluminum oxide and silicon oxide is that it allows for excellent recording density characteristics. (Column 6 line 20)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized an underlayer consisting of at least one selected from the group consisting of cobalt oxide, chromium oxide, iron oxide, nickel oxide and magnesium oxide and at least one selected from the group consisting of silicon oxide, aluminum oxide, titanium oxide, tantalum oxide and zinc oxide because it allows for producing a magnetic disc with excellent recording density characteristics.

Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of Chen et al. and further in view of Shiroishi et al. as applied to claims 55-57, 60, 63, 65, 66 and 67 above, and further in view of Ohno et al. (U.S. Pat. 4,842,917).

The difference not yet discussed is that the atmosphere comprising oxygen is not discussed.

Ohno et al. teach forming an underlayer for a magnetic thin film containing as a principal component at least one of Cr and Mo. (Column 5 lines 30-33) The crystallographic orientation for the magnetic film can be made random and the crystalline size reduced simply by adding a predetermined amount of an oxidizing gas, e.g. oxygen, air or water vapor, to an Ar gas atmosphere which is used when the thin film is formed by a method such as sputtering. (Column 5 lines 39-47)

The motivation for utilizing oxygen for deposition of the underlayer is that it allows for reducing the crystalline size of the magnetic film. (Column 5 lines 39-47)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized oxygen in the sputtering gas when sputtering the underlayer as taught by Ohno et al. because it allows for reducing the crystalline size of the magnetic film.

Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of Chen et al. and further in view of Shiroishi et al. as applied to claims 55-57, 60, 63, 65, 66 and 67 above, and further in view of Howard (U.S. Pat. 4,778,582).

The difference not yet discussed where the protective layer is formed from a target of carbon and where sputtering gas contains argon and contains at least one of nitrogen and hydrogen.

Howard teach sputtering a protective layer on a magnetic disk by utilizing a graphite target (i.e. carbon target) and utilizing an Ar and H₂ atmosphere. (Column 3 line 23, lines 35-40)

The motivation for forming a protective layer from a target of carbon and where sputtering gas contains argon and hydrogen is that it allows for producing a layer that has good corrosion resistance and wear resistance. (Column 1 line 68; Column 2 lines 1-2)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the protective layer from a graphite target and in a sputtering atmosphere of Ar and H₂ as taught by Howard because it allows for producing a layer that has good corrosion resistance and wear resistance.

Response to Arguments

Applicant's arguments filed 5-11-05 have been fully considered but they are not persuasive.

At the outset it should be noted that it is unclear if claim 67 is meant to be pending.

In response to Applicant's argument that the prior art of record does not teach the deposition of a granular structure, it is argued that Nelson et al. uses the same process and allows for film morphology control which leads to granular film production.

Chen et al. newly cited teach that granular film deposition with oxide segregation is desirable. (See Nelson et al. and Chen et al. discussed above)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
July 20, 2005